

# (12) UK Patent Application (19) GB (11) 2 005 200 A

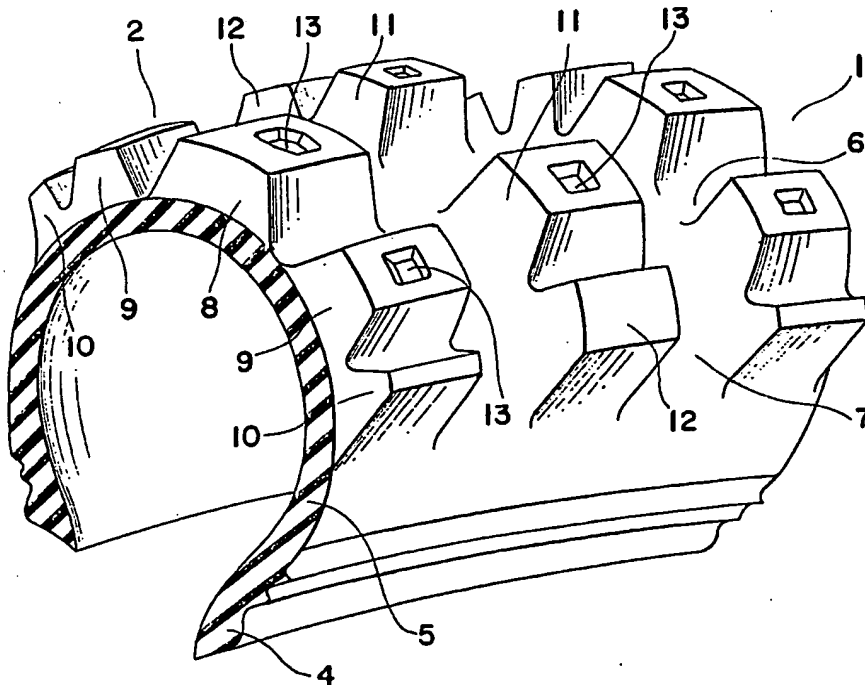
(21) Application No 7836325  
(22) Date of filing 11 Sep 1978  
(23) Claims filed 11 Sep 1978  
(23) Claims filed 9 Jan 1979  
(30) Priority data  
(31) 52/122865U  
(32) 11 Sep 1977  
(33) Japan (JP)  
(43) Application published  
19 Apr 1979  
(51) INT CL<sup>2</sup>  
B60C 11/10 11/04  
(52) Domestic classification  
B7C 3D3  
(56) Documents cited  
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GB 1441651  
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(58) Field of search  
B7C

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## (54) Wheel tire tread

(57) A wheel tire (1) for use in a motorcycle, comprises a tread portion (2) formed with a plurality of projections or blocks outwardly extending therefrom, each of some of the blocks being formed with a recess (13). The ratio of the radial depth of each recess to the radial height of the corresponding block is preferably not greater than  $\frac{1}{2}$ , and in plan view the recesses may be of circular, triangular or other polygonal shape.

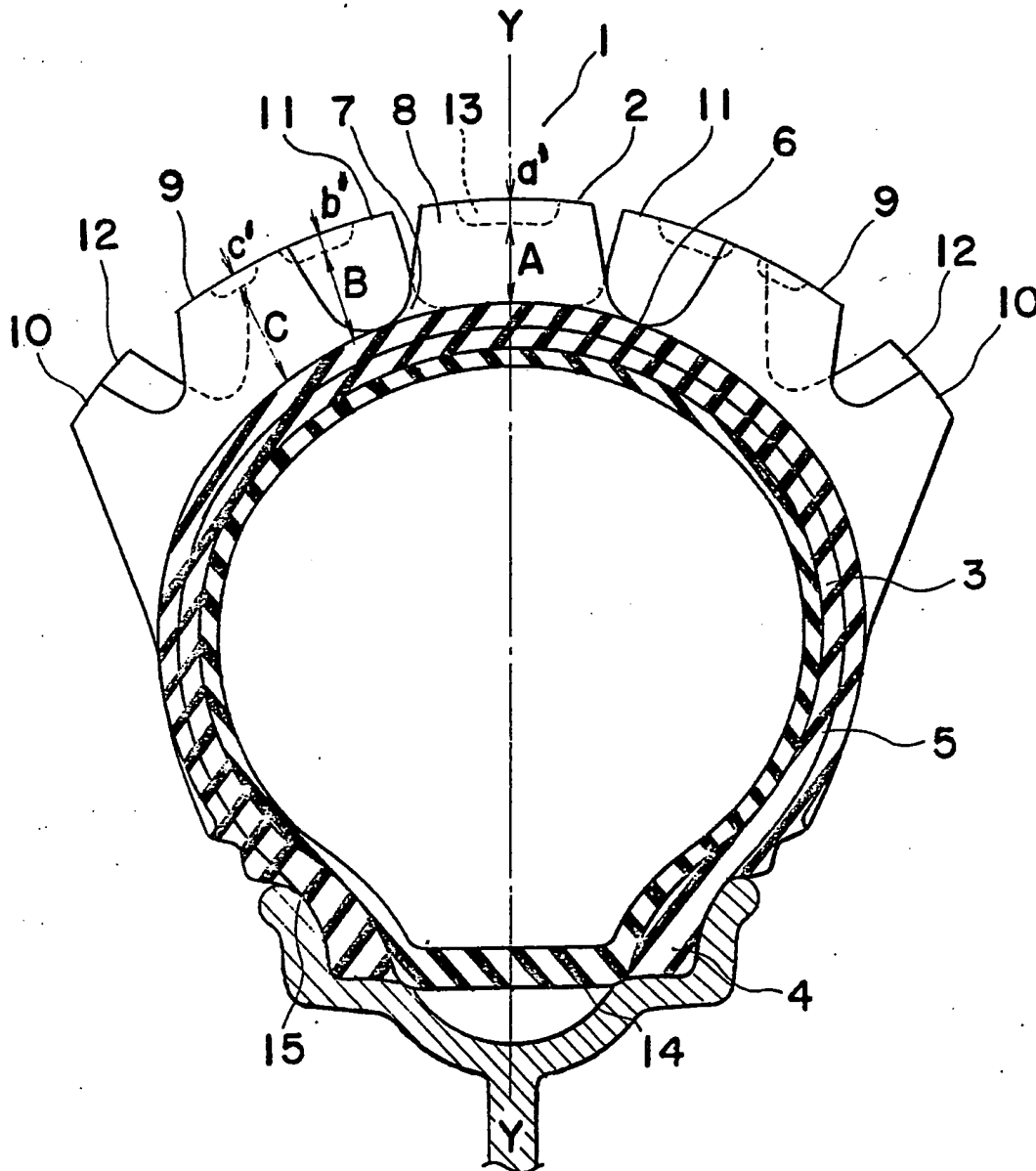
Fig. 3



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Fig. 1



*Fig. 2*

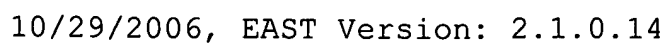
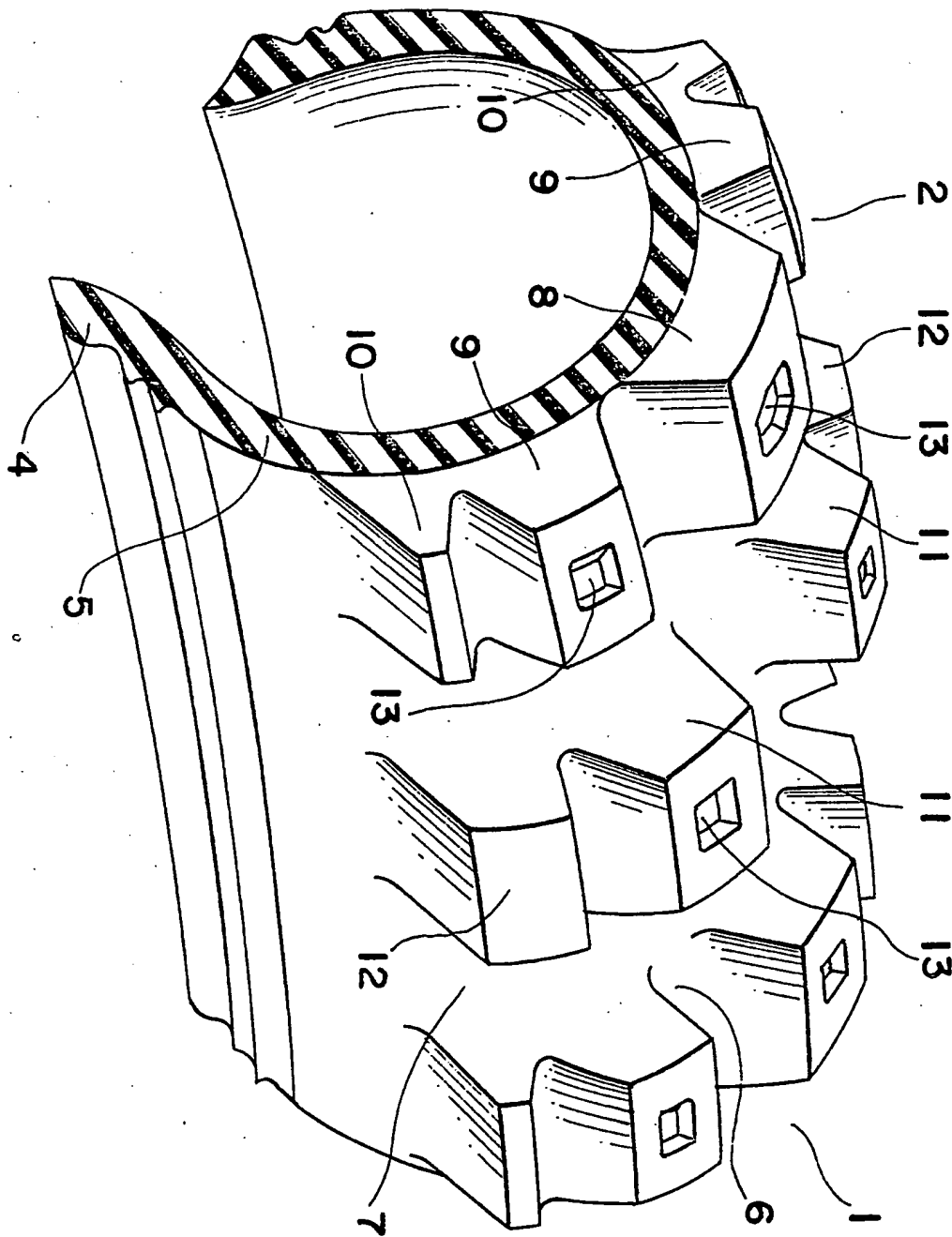


Fig. 3



## SPECIFICATION

### Wheel Tire

The present invention generally relates to wheel tires, and more particularly, to wheel tires suited for use in motorcycles.

More specifically, the present invention pertains to the wheel tires of a type having a block-patterned tread, the terms "block-patterned" being to be understood as meaning the pattern formed by a plurality of solid projections or blocks outwardly protruding from a tread area of the tire.

The wheel tire having the block-patterned tread is currently commercially available. In particular, each of the solid projections or blocks outwardly protruding from the tread area of the conventional tire has a flat contact area adapted to contact the road surface. With this conventional wheel tire, improvement in holding capability of the tire relative to the road surface has long been desired.

Accordingly, the present invention is intended to provide a wheel tire capable of exhibiting a relatively high holding capability relative to the road surface by providing a recess preferably in each of the solid projections or blocks.

According to the present invention, since the projections or blocks have their recesses defined therein, the number of edges on the tread area of the tire is increased with corresponding increase in holding capability of the tire relative to the road surface. This is advantageous in that the tire according to the present invention gives a relatively high braking performance. In addition, the presence of the recesses allows the tire as a whole to be manufactured with less rubber material and, consequently to have a decreased weight.

These and other objects and features of the present invention will become apparent from the following description taken in conjunction with a preferred embodiment thereof with reference to the accompanying drawings, in which:

Fig. 1 is a cross sectional view of a wheel tire embodying the present invention;

Fig. 2 is a top plan view of a portion of the wheel tire shown in Fig. 1; and

Fig. 3 is a perspective view of that portion of the wheel tire shown in Fig. 2.

Before the description of the present invention proceeds, it is to be noted that like parts are designated by like reference numerals throughout the accompanying drawings.

Referring now to the accompanying drawings, a wheel tire 1 particularly suited for use in a motorcycle comprises a tread area 2, a pair of side wall areas 5 opposed to each other and contiguous to both sides of the tread area 2, and a pair of bead portions 4 in which respective bead cores are embedded as is well known to those skilled in the art. The wheel tire 1 further comprises any known carcass structure 3 held in position to face a known inner tube 14 positioned inside the wheel tire 1 and mounted on any

known wheel rim whose rim flanges are illustrated by 15 as engaged to the respective bead portions 4.

So far illustrated, the tread area 2 of the tire 1 has a plurality of blocks integrally formed therewith and protruding outwards therefrom said blocks being defined by a plurality of grooves 6, extending circumferentially of the tire, and a plurality of transverse grooves 7 extending at right angles to the mid-circumferential plane lying at right angles designated by Y—Y in Fig. 1, the blocks so defined being designated by 8, 9, 10, 11 and 12. The depth of each of the circumferentially extending grooves 6 is smaller than the depth of each of the transverse grooves 7. Of these blocks, the blocks 8, 9 and 11 are generally arranged in five rows in a direction circumferentially of the tire, the blocks 8 of one row, which extends in alignment with the mid-circumferential plane Y—Y being referred to as center blocks; the blocks 11 of two rows, one on each side of the row of the center blocks 8, being referred to as second blocks; and the blocks 9 of the remaining two rows, one on each side of the row of the center blocks 8 and extending on one side of the adjacent row of the second blocks 11 remote from the row of the center blocks 8, being referred to as third blocks.

In accordance with the present invention, one end face of each of the center, second and third blocks 8, 11 and 9 opposed to the body of the tire 1 is formed with a recess 13 of predetermined depth extending inwardly of the corresponding block. So far illustrated, each of the recesses 13 defined in the center, second and third blocks 8, 11 and 9 is shown as having a generally rectangular shape, but may have any desired shape, such as circular or triangular or any other polygonal shape.

The recesses 13 defined in each of the center, second and third blocks 8, 11 and 9 are preferably so dimensioned as to satisfy the following requirement:

$$a'/A=b'/B=c'/C<1/2$$

wherein  $a'$  represents the depth of each of the recesses 13 defined in the center blocks 8,  $b'$  represents the depth of each of the recesses 13 defined in the second blocks 11,  $c'$  represents the depth of each of the recesses 13 defined in the third blocks 9,  $A$  represents the maximum height of each of the center blocks 8 less the depth  $a'$ ,  $B$  represents the maximum height of each of the second blocks 11 less the depth  $b'$  and  $C$  represents the maximum height of each of the third blocks 9 less the depth  $c'$ .

Furthermore, each of the recesses 13 in the center, second and third blocks 8, 9 and 11 has its opening defined on the end face of the corresponding block, the perimeter of said opening of each recess being preferably spaced a distance of 4 to 10 mm. from the perimeter of the end face of such corresponding block. In particular, where each of the openings of the

recesses 13 in the center, second and third blocks 8, 11 and 9 is of a generally rectangular shape as shown, the distance D between each of the opposed circumferential sides of any one of the openings of the recesses 13 in the center blocks 8 and the adjacent circumferential side edge of the end face of such center block 8 and the distance E between each of the opposed transverse sides of said one of the openings of the recesses 13 in such center block 8 and the adjacent transverse side edge of the same end face of such center block 8, which may be equal to each other or different from each other, are preferably within the range of 4 to 10 mm. A similar description concerning the distances D and E can equally apply to the distances, such as designated by G and H, in the third blocks 9 and those designated by J and K in the second blocks 11 in Fig. 2.

Although not shown, recesses similar to the recesses 13 may also be formed in the blocks other than the center, second and third blocks 8, 11 and 9.

It is to be noted that, if each of the ratios,  $a'/A$ ,  $b'/B$  and  $c'/C$ , is greater than  $1/2$ , the rigidity of the corresponding blocks 8, 11 and 9 will be reduced to such an extent that the traction force which may be transmitted from the tire to the road surface during the use of the tire will be lowered and, also, the blocks will be susceptible to damage. In the present invention, the requirement of the ratios being  $1/2$  or less has been selected in consideration of the situation in which a fresh tire of the construction according to the present invention can exhibit its maximum possible performance before the recesses 13 disappear due to wear of a portion of each of the blocks surrounding the corresponding recess 13. This means that the tire of the construction according to the present invention can advantageously be used as a tire for use in a racing motorcycle and, when and after used, can be used in a motorcycle during motorcycle drive practice.

It is further to be noted that, within the range of 4 to 10 mm., each of the distances D, E, G, H, J and K may be selected in consideration of the surface area of the end face of the corresponding blocks and the depth of each of the grooves surrounding the blocks. According to a series of experiments conducted by the inventor of the present invention, it has been found that, if each distance D, E, G, H, J and K is less than the lowermost limit of 4 mm., a portion of each of the blocks surrounding the corresponding recess 13 is susceptible to wear and/or cracking under the influence of the increased surface area of contact of the tire tread to the road surface and, on the other hand, that if such distance is more than the uppermost limit of 10 mm., any meritorious effect, which should be brought about by the employment of the recesses 13, is not observed.

Although the present invention has fully been described by way of example with reference to the accompanying drawings, it is to be noted that various changes and modifications are apparent to those skilled in the art. By way of example, the

blocks 8 to 12 may not be always arranged in such a pattern as illustrated, but may be arranged in any desired pattern. Such changes and modifications are, unless they depart from the true scope of the present invention, to be understood as included therein.

#### Claims

1. A wheel tire for use in a motorcycle, which comprises a tire body having a tread portion, a pair of opposed side walls integrally extending from respective side edges of said tread portion, and a pair of opposed bead portions integrally extending from respective free ends of the individual side walls, said tire body including bead cores embedded respectively in said bead portions and a carcass structure embedded therein, a plurality of blocks extending integrally and outwardly from the tread portion to a predetermined height, and a recesses of predetermined depth defined in at least some of the blocks and each extending inwardly of the corresponding block.

2. A wheel tire as claimed in claim 1, wherein said at least some of the blocks are arranged in a row extending in alignment with the mid-circumferential plane of the tire in a direction circumferentially of the tire.

3. A wheel tire as claimed in claim 2, wherein the blocks bearing the recesses are arranged in five rows each extending in a direction circumferentially of the tire, a first one of said rows extending in alignment with the mid circumferential plane of the tire, second and third ones of said rows extending on respective sides of said first row of the blocks, and the remaining fourth and fifth rows extending on respective sides of the first row of the blocks and externally of said second and third rows of the blocks.

4. A wheel tire as claimed in any preceding claim, wherein the ratio of the depth of each of the recesses relative to the maximum height of the corresponding block is  $1/2$  or less.

5. A wheel tire as claimed in any preceding claim wherein the opening defined by each recess on the free end face of the corresponding block is such that, the perimeter of said opening is spaced a distance of 4 to 10 mm. from the periphery of said free end face of said corresponding block.

6. A tire for a motorcycle wheel having a tread comprising protruding blocks at least some of said blocks having a recess in an exposed end face.

7. A tire substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

New claims or amendments to claims filed on 9:1:79

Superseded claims, 1

New or Amended Claims:—

125: 1. A wheel tire for use in a motorcycle, which comprises a tire body having a tread portion, a pair of opposed side walls integrally extending from respective side edges of said tread portion,

and a pair of opposed bead portions integrally extending from respective free ends of the individual side walls, said tire body including head cores embedded respectively in said bead portions and a carcass structure embedded therein, a plurality of blocks extending integrally and outwardly from the tread portion to a predetermined height, and recesses of predetermined depth opening on the free end

10 faces of at least some of the blocks and each extending inwardly of the corresponding block, the perimeter of each said recess being spaced a distance of 4 to 10 mm. from the periphery of said free end face of said corresponding block, 15 wherein the ratio of the depth of each of the recesses relative to the maximum height of the corresponding block is  $1/2$  or less.

Printed for Her Majesty's Stationary Office by the Courier Press, Leamington Spa, 1979, Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.